P. Duffy

RUSH #7

ENTERED

1600

RAW SEQUENCE LISTING DATE: 06/05/2002
PATENT APPLICATION: US/09/667,130 TIME: 10:41:08

Input Set : A:\Sequence Listing (ASCII copy) - US5.txt
Output Set: N:\CRF3\06052002\I667130.raw

3 <110> APPLICANT: Barnwell, John W
5 <120> TITLE OF INVENTION: PLASMODIUM VIVAX BLOOD STAGE ANTIGENS, ANTIBODIES, AND DIAGNOSTIC ASSAYS
7 <130> FILE REFERENCE: 5986/17686-US5
9 <140> CURRENT APPLICATION NUMBER: US 09/667,130
10 <141> CURRENT FILING DATE: 2000-09-21
12 <150> PRIOR APPLICATION NUMBER: US 08/719,821
13 <151> PRIOR FILING DATE: 1996-09-30
15 <150> PRIOR APPLICATION NUMBER: US 08/478,417
16 <151> PRIOR FILING DATE: 1995-06-07
18 <150> PRIOR APPLICATION NUMBER: US 08/072,610
19 <151> PRIOR FILING DATE: 1993-06-02
21 <160> NUMBER OF SEQ ID NOS: 4
23 <170> SOFTWARE: PatentIn version 3.1
25 <210> SEQ ID NO: 1
26 <211> LENGTH: 3337
27 <212> TYPE: DNA
28 <213> ORGANISM: Plasmodium vivax
30 <400> SEQUENCE: 1
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33 ttttgctttt cttttaattc atgcttcaac agtaagataa aaataatcta taaaaactgc 120
35 tatatataca tatatattca taagtggcat ttgtgaattg cgatcattta aatttacgta 180
37 aaaacaatat tgaaaaaaat ttttttttttt ttttttttttt tgttctacag aacgatttag 240
39 aattggaaaa tgcttctgat gatgttgtag aggtggagga tccttcaaac gacggtttag 300
41 aattagaaga ggaaaatttt gatgagaatt caggtgatga tgaaactctt ttagatgcta 360
43 cccccgaaga tgactttgcc ttaacagatt tgccaattga agacgatgag gaagtcaacg 420
45 aaacgttaga tggaggtgaa tcattaggag aggtttccac tgaagatatg gaaacagaag 480
47 atggctcaac agatgatacg gaaacagaag aaggactacc tggtgatatg gaaggagaag 540
49 aagaagctgg cgatatggaa gcaggggaag aagctggtga tttggaagca ggggaagaaa 600
51 ctggcgattt ggaagcaggg gaagaaactg gcgatttgga agcaggggaa gaagctggtg 660
53 atttggaagc aggggaagaa actggcgatt tggaagcagg ggaagaaact ggagatgcgg 720
55 aaactgaaga aggagcaact ggagatgcgg aaactgaaaa tggagcaact gtgtatgtag 780
57 acacagaaga tagttcagct gatggagcag aaaaagtaca tgttcctgct caagaaaatg 840
59 tacaacctgc cgatagtaat gatgccctct ttggaagtat tttggataaa gatataattt 900
61 ttgatcatat taaagatttc gagccactat tcgaacaaat tgtggcgggt actgctaaac 960
63 atgttacggg acaagaattg ccaatgaaac ctgtaccatt accagtggca gaagagcccg 1020
65 cgcaagtacc agcggaagaa ttagatgcca ctccagagga tgacttcgca ttagatgtta 1080
67 cagaatctcc cgaggaagta gaattagtat tagatgaaga ggcaactgaa gaagaatcaa 1140
69 cggaagtggg accaacggaa gaaggaccaa ccgaagaatt agatgccact ccagaggatg 1200
71 gatttcgcat tagacgaaac tgcagaagga gaaacagaag aaacgtagag ggagaagaaa 1260
73 cagaagaagc tgcagaagga gaagtatcag aagaaactcc agaaggagaa gaagagttag 1320
75 aggcaactcc agaggatgat ttcgcattag atggaactac attagaagaa accgaagaaa 1380
77 ctgcagaagg agaagaaacc gtagagggag aagaaaccgt agagggagaa gaaaccgtag 1440
79 agggagaaga agctgcagaa ggagaagaag agttagaggc aactccagag gatgacttcc 1500

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 81 aattagaaga accatcagga gaaggagaag gggaaggaga aggagaaggg gaaggagaag   1560
 83 gagaagcgtt agtagcagtg ccagtagtgg ccgaaccggt agaagtagtg actcctgctc   1620
 85 agcctgtcaa accaatggtc gctccaacgg cagatgaaac tttattcgtt gatatcttag   1680
 87 ataacgattt aacgtatgca gacattacat cctttgagcc attatttaaa caaatcctca   1740
 89 aggatcctga tgcaggagag gctgtaacag taccatcaaa ggaagcacct gtacaagtac   1800
 91 cagtggcagt agggcccgcg caagaagtgc caacggaaga attgatgcaa ctccaagagg   1860
 93 acgatttcga attagaagga actgcagaag ctccagagga aggagaatta gtattagaag   1920
 95 gagaaggaga accaacggaa gaagagccaa gagaaggaga gccaacagaa ggagaagtgc   1980
 97 cagaagaaga attagaggca actccagagg acgatttcga attagaagaa ccaacaggag   2040
 99 aagaagtaga agaaaccgta gagggcgaag aaactgcaga aggagaagaa gtggaagagg   2100
101 tacctgcaga agtagaagaa gtggaagagg tacctgcaga agtagaagaa gtggaagagg   2160
103 taccagaaga agtagaagag gtacccgcag aagtagaaga agtggaagag gtaccagaag   2220
105 aagtggaaga ggtaccagaa gaagtggaag aggtaccaga agaagtggaa gaggtaccag   2280
107 aagaagtgga agaagtggaa gaagtagaag aagtagaggt accagcggta gtagaagtag   2340
109 aagtaccagc ggtagtagaa gaagaggtgc cagaagaagt agaagaagaa gaagaagagg   2400
111 aagaaccagt agaggaagaa gatgtattac aattagtaat accatcggaa gaagatatac   2460
113 aattagacaa accaaagaaa gacgaattag gctctggaat tttatctatc atcgacatgc   2520
115 actaccaaga cgttccaaag gaatttatgg aagaagaaga agaaactgca gtgtatccat   2580
117 tgaaaccaga agattttgca aaggaagatt cacaatctac agaatggctc acattcattc   2640
119 aaggcctaga aggcgactgg gaacgattag aagtgagctt aaataaggct agagaaagat   2700
121 ggatggaaca aagaaataaa gaatgggctg gctggcttcg cttaattgaa aataaatggt   2760
123 cagaatatag tcaaatttca acaaaaggaa aggacccagc tggtttgaga aaacgagagt   2820
125 ggagcgacga gaaatggaaa aaatggttta aagcagaagt caaatcccaa attgattcac   2880
127 acttgaaaaa atggatgaac gacactcatt ccaatttatt taaaattctt gtgaaagata   2940
129 tgtcacaatt tgaaaacaag aaaaccaaag aatggttaat gaatcactgg aaaaagaacg   3000
131 aacggggtta tggttctgaa tcatttgaag ttatgaccac atcaaaatta ttaaatgtgg   3060
133 ctaagagtcg agaatggtac cgtgccaatc ctaatataaa tagagaaaga agagaactca   3120
135 tgaaatggtt tctcctaaaa gaaaacgaat atttaggaca aagaatggaa aaaatggact   3180
137 cattggaaaa aagttaaatt ttttgtgttc aattcaatgt gtacaacatt ttctggaaaa   3240
139 cgcctaacca aggaagaatg gaatcaattt gttaatgaaa taaaagtttg aattatagaa   3300
141 aaaagaacag attattctct tataaaataa ataattc                           3337
144 <210> SEQ ID NO: 2
145 <211> LENGTH: 1018
146 <212> TYPE: PRT
147 <213> ORGANISM: Plasmodium vivax
149 <400> SEQUENCE: 2
151 Asn Ser Gly Lys Val Thr Thr Met Val Ser Tyr Leu Tyr Ile Thr Leu
152 1               5                  10                  15
155 Leu Ile Leu Ser Phe Ala Phe Leu Leu Ile His Ala Ser Thr Asn Asp
156             20                  25                  30
159 Leu Glu Leu Glu Asn Ala Ser Asp Asp Val Val Glu Val Glu Asp Pro
160         35                  40                  45
163 Ser Asn Asp Gly Leu Glu Leu Glu Glu Glu Asn Phe Asp Glu Asn Ser
164     50                  55                  60
167 Gly Asp Asp Glu Thr Leu Leu Asp Ala Thr Pro Glu Asp Asp Phe Ala
168 65                  70                  75                  80
171 Leu Thr Asp Leu Pro Ile Glu Asp Asp Glu Glu Val Asn Glu Thr Leu
172                 85                  90                  95
175 Asp Gly Gly Glu Ser Leu Gly Glu Val Ser Thr Glu Asp Met Glu Thr
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176                 100                 105                 110
179 Glu Asp Gly Ser Thr Asp Asp Thr Glu Thr Glu Glu Gly Leu Pro Gly
180         115                 120                 125
183 Asp Met Glu Gly Glu Glu Glu Ala Gly Asp Met Glu Ala Gly Glu Glu
184     130                 135                 140
187 Ala Gly Asp Leu Glu Ala Gly Glu Glu Thr Gly Asp Leu Glu Ala Gly
188 145                 150                 155                 160
191 Glu Glu Thr Gly Asp Leu Glu Ala Gly Glu Glu Ala Gly Asp Leu Glu
192                 165                 170                 175
195 Ala Gly Glu Glu Thr Gly Asp Leu Glu Ala Gly Glu Glu Thr Gly Asp
196             180                 185                 190
199 Ala Glu Thr Glu Glu Gly Ala Thr Gly Asp Ala Glu Thr Glu Asn Gly
200         195                 200                 205
203 Ala Thr Val Tyr Val Asp Thr Glu Asp Ser Ser Ala Asp Gly Ala Glu
204     210                 215                 220
207 Lys Val His Val Pro Ala Gln Glu Asn Val Gln Pro Ala Asp Ser Asn
208 225                 230                 235                 240
211 Asp Ala Leu Phe Gly Ser Ile Leu Asp Lys Asp Ile Ile Phe Asp His
212                 245                 250                 255
215 Ile Lys Asp Phe Glu Pro Leu Phe Glu Gln Ile Val Ala Gly Thr Ala
216             260                 265                 270
219 Lys His Val Thr Gly Gln Glu Leu Pro Met Lys Pro Val Pro Leu Pro
220         275                 280                 285
223 Val Ala Glu Glu Pro Ala Gln Val Pro Ala Glu Glu Leu Asp Ala Thr
224     290                 295                 300
227 Pro Glu Asp Asp Phe Ala Leu Asp Val Thr Glu Ser Pro Glu Glu Val
228 305                 310                 315                 320
231 Glu Leu Val Leu Asp Glu Glu Ala Thr Glu Glu Glu Ser Thr Glu Val
232                 325                 330                 335
235 Gly Pro Thr Glu Glu Gly Pro Thr Glu Glu Leu Asp Ala Thr Pro Glu
236             340                 345                 350
239 Asp Gly Phe Arg Ile Arg Arg Asn Cys Arg Arg Arg Asn Arg Arg Asn
240         355                 360                 365
243 Val Glu Gly Glu Glu Thr Glu Glu Ala Ala Glu Gly Glu Val Ser Glu
244     370                 375                 380
247 Glu Thr Pro Glu Gly Glu Glu Glu Leu Glu Ala Thr Pro Glu Asp Asp
248 385                 390                 395                 400
251 Phe Ala Leu Asp Gly Thr Thr Leu Glu Glu Thr Glu Glu Thr Ala Glu
252                 405                 410                 415
255 Gly Glu Glu Thr Val Glu Gly Glu Glu Thr Val Glu Gly Glu Glu Thr
256             420                 425                 430
259 Val Glu Gly Glu Glu Ala Ala Glu Gly Glu Glu Glu Leu Glu Ala Thr
260         435                 440                 445
263 Pro Glu Asp Asp Phe Gln Leu Glu Glu Pro Ser Gly Glu Gly Glu Gly
264     450                 455                 460
267 Glu Gly Glu Gly Glu Gly Glu Gly Glu Gly Glu Ala Leu Val Ala Val
268 465                 470                 475                 480
271 Pro Val Val Ala Glu Pro Val Glu Val Val Thr Pro Ala Gln Pro Val
272                 485                 490                 495
```

RAW SEQUENCE LISTING DATE: 06/05/2002
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```
275 Lys Pro Met Val Ala Pro Thr Ala Asp Glu Thr Leu Phe Val Asp Ile
276             500                 505                 510
279 Leu Asp Asn Asp Leu Thr Tyr Ala Asp Ile Thr Ser Phe Glu Pro Leu
280         515                 520                 525
283 Phe Lys Gln Ile Leu Lys Asp Pro Asp Ala Gly Glu Ala Val Thr Val
284     530                 535                 540
287 Pro Ser Lys Glu Ala Pro Val Gln Val Pro Val Ala Val Gly Pro Ala
288 545                 550                 555                 560
291 Gln Glu Val Pro Thr Glu Glu Leu Met Gln Leu Gln Glu Asp Asp Phe
292                 565                 570                 575
295 Glu Leu Glu Gly Thr Ala Glu Ala Pro Glu Glu Gly Glu Leu Val Leu
296             580                 585                 590
299 Glu Gly Glu Gly Glu Pro Thr Glu Glu Glu Pro Arg Glu Gly Glu Pro
300         595                 600                 605
303 Thr Glu Gly Glu Val Pro Glu Glu Glu Leu Glu Ala Thr Pro Glu Asp
304     610                 615                 620
307 Asp Phe Glu Leu Glu Glu Pro Thr Gly Glu Glu Val Glu Glu Thr Val
308 625                 630                 635                 640
311 Glu Gly Glu Glu Thr Ala Glu Gly Glu Glu Val Glu Glu Val Pro Ala
312                 645                 650                 655
315 Glu Val Glu Glu Val Glu Glu Val Pro Ala Glu Val Glu Glu Val Glu
316             660                 665                 670
319 Glu Val Pro Glu Glu Val Glu Glu Val Pro Ala Glu Val Glu Glu Val
320         675                 680                 685
323 Glu Glu Val Pro Glu Glu Val Glu Glu Val Pro Glu Glu Val Glu Glu
324     690                 695                 700
327 Val Pro Glu Glu Val Glu Glu Val Pro Glu Glu Val Glu Glu Val Glu
328 705                 710                 715                 720
331 Glu Val Glu Glu Val Glu Val Pro Ala Val Val Glu Val Glu Val Pro
332                 725                 730                 735
335 Ala Val Val Glu Glu Glu Val Pro Glu Glu Val Glu Glu Glu Glu Glu
336             740                 745                 750
339 Glu Glu Glu Pro Val Glu Glu Glu Asp Val Leu Gln Leu Val Ile Pro
340         755                 760                 765
343 Ser Glu Glu Asp Ile Gln Leu Asp Lys Pro Lys Lys Asp Glu Leu Gly
344     770                 775                 780
347 Ser Gly Ile Leu Ser Ile Ile Asp Met His Tyr Gln Asp Val Pro Lys
348 785                 790                 795                 800
351 Glu Phe Met Glu Glu Glu Glu Glu Thr Ala Val Tyr Pro Leu Lys Pro
352                 805                 810                 815
355 Glu Asp Phe Ala Lys Glu Asp Ser Gln Ser Thr Glu Trp Leu Thr Phe
356             820                 825                 830
359 Ile Gln Gly Leu Glu Gly Asp Trp Glu Arg Leu Glu Val Ser Leu Asn
360         835                 840                 845
363 Lys Ala Arg Glu Arg Trp Met Glu Gln Arg Asn Lys Glu Trp Ala Gly
364     850                 855                 860
367 Trp Leu Arg Leu Ile Glu Asn Lys Trp Ser Glu Tyr Ser Gln Ile Ser
368 865                 870                 875                 880
371 Thr Lys Gly Lys Asp Pro Ala Gly Leu Arg Lys Arg Glu Trp Ser Asp
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RAW SEQUENCE LISTING DATE: 06/05/2002
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Input Set : A:\Sequence Listing (ASCII copy) - US5.txt
Output Set: N:\CRF3\06052002\I667130.raw

```
372                 885                 890                 895
375 Glu Lys Trp Lys Lys Trp Phe Lys Ala Glu Val Lys Ser Gln Ile Asp
376             900                 905                 910
379 Ser His Leu Lys Lys Trp Met Asn Asp Thr His Ser Asn Leu Phe Lys
380         915                 920                 925
383 Ile Leu Val Lys Asp Met Ser Gln Phe Glu Asn Lys Lys Thr Lys Glu
384     930                 935                 940
387 Trp Leu Met Asn His Trp Lys Lys Asn Glu Arg Gly Tyr Gly Ser Glu
388 945                 950                 955                 960
391 Ser Phe Glu Val Met Thr Thr Ser Lys Leu Leu Asn Val Ala Lys Ser
392                 965                 970                 975
395 Arg Glu Trp Tyr Arg Ala Asn Pro Asn Ile Asn Arg Glu Arg Arg Glu
396             980                 985                 990
399 Leu Met Lys Trp Phe Leu Leu Lys  Glu Asn Glu Tyr Leu  Gly Gln Arg
400         995                 1000                1005
403 Met Glu  Lys Met Asp Ser Leu  Glu Lys Ser
404     1010                1015
407 <210> SEQ ID NO: 3
408 <211> LENGTH: 9
409 <212> TYPE: PRT
410 <213> ORGANISM: Plasmodium vivax
412 <220> FEATURE:
413 <221> NAME/KEY: MISC_FEATURE
414 <222> LOCATION: (1)..(9)
415 <223> OTHER INFORMATION: where Xaa1 can be either Leu or Met
418 <220> FEATURE:
419 <221> NAME/KEY: MISC_FEATURE
420 <222> LOCATION: (1)..(9)
421 <223> OTHER INFORMATION: where Xaa2 can be either Ala or Thr
424 <400> SEQUENCE: 3
W--> 426 Asp Xaa Glu Ala Gly Glu Glu Xaa Gly
427 1               5
430 <210> SEQ ID NO: 4
431 <211> LENGTH: 7
432 <212> TYPE: PRT
433 <213> ORGANISM: Plasmodium vivax
435 <400> SEQUENCE: 4
437 Glu Glu Val Glu Glu Val Pro
438 1               5
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RAW SEQUENCE LISTING ERROR SUMMARY DATE: 06/05/2002
PATENT APPLICATION: US/09/667,130 TIME: 10:41:09

Input Set : A:\Sequence Listing (ASCII copy) - US5.txt
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Please Note:
Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:3; Xaa Pos. 2,8

Invalid Line Length:
The rules require that a line not exceed 72 characters in length. This includes spaces.

Seq#:1; Line(s) 5

VERIFICATION SUMMARY DATE: 06/05/2002
PATENT APPLICATION: **US/09/667,130** TIME: 10:41:09

Input Set : **A:\Sequence Listing (ASCII copy) - US5.txt**
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L:426 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:3 after pos.:0